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MARTIN G. REIFFIN,

MARTIN G. REIFFIN   ●   Before the Board of Appeals
3895 COTTONWOOD DRIVE
DONVILLE, CA 94526

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DEC 0 1 1988

GROUP 230

Examiner's Answer

1.   This is an Examiner's Answer to the appeal of the March 09, 1988 18, 1987 final rejection, Paper Number 18. Remaining at issue is an art rejection for some of the substituted claims filed on April 28, 1988, paper no. 20, under 35 U.S.C. 102 and 35 U.S.C. 103.

2.   Claims 51-56 substituted for finally rejected claims.

3.   This appeal involves claims 51, 54, and 56.

4.   The amendment after final rejection filed on April 19, 1988 has been entered.

5.   Claim 53 is allowed.

6.   Claims 52 and 55 are objected to as being dependent upon a rejected based claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7.   A correct copy of appealed claims 51, 54, and 56 appears on pages 7 - 10 of appellant's brief.

8.   The text of those sections of Title 35, U.S. Code relied on in this appeal can be found in the final rejection or herein.

9.   The prior art of record relied on is :

4,464,730   Lawrence et al   Aug. 7, 1984

10.   NEW REFERENCES

The new prior art made of record (see attached PTO-892) and relied on with this Examiner's Answer is :

4,513,391   Maddock   Apr. 23, 1985
4,293,909   Catiller et al   Oct. 6, 1981

11. The description of the invention is adequately described on pages 3 - 6 of appellant's brief.

12. The prior art relied upon in this appeal is described in pages 11 and 12 of appellant's brief.

13.   THIS IS A NEW GROUND OF REJECTION

14. The following is a   quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action :

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States

before the invention thereof by the applicant for patent, or
on an international application by another who has fulfilled
the requirements of paragraphs (1), (2), and (4) of section
371(c) of this title before the invention thereof by the
applicant for patent.

15.   Claim 56 is rejected under 35 U.S.C. 102(e) as being clearly
anticipated by Lawrence et al.

16.   <u>Lawrence</u> et al disclosed a computer system or data processing
(DP) system which clearly anticipated the claimed invention,
comprising a central processing unit (microprocessor 26), a
console having keys for entry of successive characters (KB1), a
memory storing a buffer for holding the code (text stream buffer
36), a code processor program (interpreter/formatter), and an
editor program (editor 10). (See fig. 5 of the reference).

17.   Once the code processor program was initiated, the code
processor program (interpreter/formatter) maintained control
of the central processing unit. Upon the activation of a
keystroke, the code processor program was interrupted and the
control of the central processing unit was passed to the editor to
enter the code into the buffer. After the editor had completed the
entry of the code byte, the control of the central processing unit
was returned to the code processor program. (See col. 13 lines 23 –
29 and col. 14 lines 14 – 18 and lines 26 – 30).

18.   Claims 51 and 54 are rejected under 35 U.S.C. 103 as being
unpatentable over the teachings of Lawrence et al alone, or
Lawrence in view of Maddock and Catiller et al.

19.   The teachings of Lawrence have been discussed hereinabove.
Specifically, when the interpreter/formatter had control of the
system in performing its functions, editing means included means
to "interrupt said formatting means" upon receipt of a "keystroke
from said keyboard" invoking said editing means to "perform a text
editing operation", (col. 14 lines 26 – 30). Thereafter, means in

said editing means for "invoking said formatting means" when a text editing step has been completed, (col. 14 lines 15 - 17).

20. It should be noted that Lawrence et al did not explicitly discuss what an editing step comprised. It would have been obvious to one of ordinary skill in the DP art that Lawrence's editing step would have included the editing of one character for editing one character was a legitimate editing step. Furthermore, the editing means performed its editing function on a keystroke-by-keystroke basis, (col. 13 line 29). In other words, the control of the system was passed back to the interpreter/formatter from the editor after each of the keystrokes.

21. Lawrence et al further disclosed that his formatting means was interrupted by the editing means thereby enabling the editing means to perform editing upon the receive of a keystroke, see col. 14 lines 26 - 27. In other passages, (inter alia, col. 14 lines 15 - 18), Lawrence et al taught that the formatting means was invoked by the editing means to perform formatting operation. It appears that there was some inconsistency of the terminology, i.e. interrupted versus invoked.

22. Specifically, once a first program (formatter) was interrupted, the system would vector to a second program (editor) which would then run its course, thereafter, system would return to the interrupted program, i.e. the first program. The interrupted program should not have been invoked by the second program.

23. When the teaching of the whole Lawrence reference is taken into consideration, the examiner submits that the formatter was interrupted by editor wherein the control was subsequently returned, not invoked by the editor, to the formatter. More particularly, Lawrence et al explicitly discussed the different priorities among different processes wherein keystroke processing

had a higher priority than text editing which in turn had higher priority than interpreting (formatting). See col. 7 lines 23 - 24. Lawrence et al further disclosed that "higher priority (was given) to the keystroke processing than to screen formatting", (see col. 11 lines 51 - 56).

24.   It was well-known to one of ordinary skill in the DP art at the filing date of Lawrence et al reference that interrupts, (not invoke), are normally associated with priority arrangements. I.e., conventionally, a process with higher priority would interrupt a process with lower priority wherein the control would be returned, not invoked, to the interrupted process after the processing of the process with the higher priority. In order to accommodate different processes having different priorities, as in Lawrence et al system, it would have been obvious to one of ordinary skill in the DP art that one process would be interrupted by another process. Therefore, it is consistent with the statement that "editing means including means to interrupt said formatting means" because the editing processing had a higher priority than formatting. The inconsistency of terminology should be resolved in favor of "interrupted".

25.   Alternatively, Maddock explicitly disclosed that reformatting was interrupted by the occurrence of keystroke signals requiring further editing of the text, (see the abstract lines 19 - 21), wherein Maddock's system was directly related to Lawrence et al's system, (see col. 1 lines 60 - 66). More particularly, Maddock disclosed a system having the editing process and formatting process ran as two parallel processes with different priorities. The foreground process (editing) took each keystroke and entered it into the refresh buffer wherein the background process (reformatting) reformatted the text when no keystroke was pending thereby enabling the reformatting to be interleaved with normal

keystroke processing. (See col. 2 lines 31 - 46).

26. The reformatting process reformatted one line at a time such that it could not be <u>interrupted</u> until the line was completed, (col. 5 lines 52 - 54). However, since the reformatting time for a line was short compared to typical inter-keystroke time, from the system stand point, the reformatting process would be interrupted when a next keystroke was received. (See col. 5 lines 61 - 64). The process of reformatting one line at a time was repeated whenever there was a pause between keystroke input and the keystroke queue was empty, (col. 5 lines 58 - 60). In other words, once the reformatting process was initiated, the reformatting process would maintain control of the central processing unit <u>until</u> a keystroke was received which would interrupt the reformatting process to execute the editing process. In summary, Maddock explicitly taught a system with a reformatting process having continuous control thereof until it was interrupted by the receiving of a keystroke.

27. It should be noted that, in order to implement interrupt, the interrupt hardware must be inherently existed in Lawrence et al's and Maddock's system. However, Lawrence et al and Maddock both did not disclose hardware, (inter alia, stack for storing content of the program counter at the time the program was interrupted), used to implement the interrupt wherein the interrupt hardware are positively recited in claims 51 and 54 of the subject application. The examiner submits that the structure of the interrupt hardware were readily apparent to one of ordinary skill in the DP art at the time the claimed invention was made because interrupt processing was a old and well known process in the computer art.

28. On the other hand, <u>Catiller</u> et al, which has a filing date more than one year before the priority date of the Lawrence et al reference and three years before the filing date of the subject

application, show the level of DP art in the interrupt hardware. Catiller et al is used to support the examiner's position that interrupt hardware was apparent to one of ordinary skill in the computer art at the filing date of Lawrence et al reference. Specifically, when a process (foreground mode) was running and an interrupt was received, the system responded to the interrupt by forcing execution of an ICALL instruction and switching the system to run another process (switch the system to a background mode). The ICALL instruction allowed the system to place an interrupt call address on the bus. The ICALL instruction saved the old PC (program counter) value on the stack before loading PC with the call address. A return to the interrupted process (the foreground mode) was accomplished by executed an IRET instruction. The top value from the stack memory is placed in the program counter for the return address. (See col 19 lines 29 - 57).

29.   It would have been obvious to one of ordinary skill in the computer art at the time the claimed invention was made to combine the teachings of Maddock and Catiller et al's with those of Lawrence et al because, as the claimed invention, all three cited references are directed toward the problem of controlling two processes running alternatively in a DP system. Moreover, the DP artisan would have recognized that use of Maddock and Catiller et al's explicit teaching (of using interrupt and interrupt hardware to switch control of the central processing unit between the two processes) would have been a conventional means of implementing the interrupt operation inherent in the Lawrence et al's system.

30.   For the reasons as set forth hereinabove, the examiner submits that Lawrence et al taught a computer system with a console, a central processing unit, editor program, and code processor program which maintained continuous control of the central processing unit until it was interrupted when a key of the console was struck whereby the control of the central processing

unit was transferred to the editor program and the control was subsequently returned back to the code processor program. Lawrence et al inherently made obvious the usage of an interrupt and its relevant hardware as the mechanism to switch the control of the central processing unit between the code processor program and editor program. Maddock and Catiller et al both more explicitly illustrate the teachings which would have been inherently obvious from the Lawrence et al's reference.

31. The affidavit by appellant under 37 CFR 1.132 filed Aug. 04, 1988 is insufficient to overcome the rejection of claims 51, 54 and 56 based upon Lawrence et al alone or in view of Maddock and Catiller et al because one of the allegations, i.e. the enablement of Lawrence et al reference, was not supported by any credible evidence whereas other allegations are directed to the different interpretations of Lawrence et al reference. The essence of the affidavit is embodied in appellant's brief. Each of the allegations will be addressed in the rebuttal section of the examiner's answer.

32.   REBUTTAL

33. The examiner has carefully considered the arguments set forth by appellant in the brief and find the arguments not persuasive. Specifically, appellant's allegations could be summarized into the following points :

   i. Lawrence et al did not provide an enabling disclosure for the features relied upon by the examiner.

   ii. Key limitation, col. 14 lines 15 - 17, relied upon by the examiner was added to the Lawrence et al application by the patentee on Feb. 17, 1984 which is after the effective filing date of the subject application, Sep. 28, 1982. Appellant asserted that the added limitation could not be used by the examiner in

rejecting the claims of the subject application.

iii. Lawrence et al's was not interrupted.

iv. Lawrence et al's formatter did not maintain control of the system.

v. Lawrence et al did not teach the claimed interrupt mode of operation.

vi. Lawrence et al did not teach the passing of control back to the formatter after each keystroke.

vii. Lawrence et al did not teach limitations as set forth in claims 51 and 54, i.e. the hardware structure of the interrupt.

The examiner respectfully traverses each of appellant's allegations.

34.   A. As to allegation i, the examiner submits that there is evidence of record which shows that the Lawrence et al reference provides an enabling disclosure. On the other hand, the examiner contends that appellant fails to prove that Lawrence et al reference is not enabling.

35.   Appellant stated that interpreter/formatter (formatter) 6 and the text editor (editor) 10 were disclosed in the drawings only as labeled boxes and in the specification only as goals or objects to be achieved. Appellant asserted that "a box in the drawings labeled "INTEPRETER/FORMATTER" or "TEXT CODE" does not teach one of ordinary skill how to write software or build hardware, nor does a specification which summarily states desired interactions".

36.   Appellant's citation of case law is duly noted. However, appellant's cited case law is not dispositive here. In <u>Phillips</u> <u>Petroleum v. U.S. Steel</u> (DC Del. 1988) 6 P.Q. 2d 1065, 1073, the

Court held :

"In order to satisfy the enablement requirement of section 112, a patent application must contain a description which enables one skilled in the art to make and use the claimed invention... That some experimentation may be necessary in order to practice the invention does not render an application non-enabling so long as the amount of experimentation is not unduly extensive. ... Moreover, because an application speaks to those skilled in the art, it need not set forth every minute detail regarding the invention.. Nor need an application disclose that which is already well known in the art" (emphasis added).

37. In In re Sasse et al (CCPA 1980) 207 USPQ 107, 111, the Court held:

"(T)he proper test of a description in a publication as a bar to a patent as the clause is used in section 102(b) required a determination of whether on skilled in the art to which the invention pertains could take the description of the invention in the printed publication and combine it with his own knowledge of the particular art and from this combination be put in possession of the invention on which a patent is sought".

38. In other words, the proper test of enablement of a patent is :
"Can one of ordinary skilled in the art build the invention disclosed in the patent without due experimentation after reading the description in the patent and using his own knowledge of the art?".

39. Firstly, it should be noted that the subject application is not rejected under 35 U.S.C. 112 first paragraph even though appellant himself failed to disclose the software program of the claimed editor and code processor program (compiler). Specifically, when the subject application is accorded with the filing date of the parent application, the software listing in the subject application is no longer part of the application for there is no software listing in the parent application.

40. The parent application's specification which does not have the software listing was repeatedly rejected under 35 U.S.C. 112 first paragraph for the lacking of an enabling disclosure.

Finially, based upon the affidavits by Mr. Mark Wadsworth and the article titled "A Real-Time Compiler System" by appellant, the 35 U.S.C. 112 first paragraph rejection was withdrawn. In other words, appellant showed that it was possible for one of ordinary skill in the art to make the claimed invention without undue experimentation even though the software program for the claimed invention was not disclosed.

41.   Secondly, it should be noted that in paragraphs 13 - 17 and 22 of the third affidavit by Mr. Mark Wadsworth, paper no. 19, affiant discussed the operations of interpreter/formatter and editor disclosed in Lawrence et al reference. Affiant clearly demonstrated that he understood the operations of the formatter and editor. If affiant understood the operations, it is reasonable to conclude that affiant, one ordinary skilled in the art, can make the formatter and editor without undue experimentation. In other words, the affidavit of record contradicts appellant's allegation that one skilled in the art can not make the formatter and editor in question.

42.   In paragraph 29 of the aforesaid affidavit, affiant alleged that the examiner had changed the operation modes of Lawrence et al's system. Affiant further alleged that the examiner failed to show "how the required modifications to the hardware and/or software are to be made to provide these proposed modes of operation". Affiant had not alleged that he did not know how to implement the disclosed formatter and editor. What affiant alleged was that he did not know how to implement the so-called "these proposed modes of operation". From the discussion of the teachings of Lawrence et al as set forth hereinabove, the examiner submits that the examiner has not changed the operations of Lawrence et al reference. The examiner merely relies upon the teachings explicitly and inherently disclosed by Lawrence et al. Therefore,

based upon the implicit admission by one of ordinary skill in the art, the affiant, the examiner submits that Lawrence et al does provide an enabling disclosure whereby one of ordinary skill in the art can implement the formatter and editor without undue experimentation.

43.   Thirdly, appellant only alleged that the specification of the Lawrence et al reference "does not teach one of ordinary skill how to write software or build hardware". Appellant fails to address the degree of experimentation involved. Hence, appellant fails to meet the test in determining the enablement of the reference.

44.   Fourthly, In In re Sasse et al, (CCPA 1980) 207 USPQ 107, 111, the Court held :

> "Whether those skilled in the art already possessed the
> necessary precursors is an issue subject to a shifting
> burden of proof. To explain, when the PTO cited a disclosure
> which expressly anticipated the present invention, i.e.
> Guillot, the burden was shifted to the applicant. He had to
> rebut the presumption of the operability of Guillot by a
> preponderance of the evidence".

45.   In this case, appellant has not rebutted the presumption of the operability of Lawrence et al by a preponderance of evidence. Appellent attempted to satisfy the requirement by submitting a third affidavit, paper no. 24. The affiant, appellant himself, stated that he never heard about "INTERPRETER/FORMATTER" and "TEXT CODE". Affiant failed to present any credible evidence to support his assertion that one of ordinary skill did not know how to implement the interpreter/formatter. Affiant even failed to address the question that whether he had ever try to implement the disclosed interpreter/formatter and if he had, what was the degree of experimentation involved. In summary, appellant has not met the burden of rebutting the presumption of operability of the Lawrence et al reference by a preponderance of evidence. Therefore, the examiner maintains that Lawrence et al provides an enabling disclosure.

46.   B. as to allegation ii, the examiner submits that the key

limitation added to Lawrence et al reference by an amendment,

i.e. "means in said editing means for invoking said formatting

means when a text editing step is completed", is a valid prior art

teaching under 35 U.S.C. 102/103. Furthermore, appellant's

allegation is misleading.

47.   In his allegation, appellant stated that the limitation was

added to claim 1 by the amendment. Appellant appears to be

suggesting that the pertinent limitation was not in the originally

filed Lawrence application (and therefore it could not be used by

the examiner as of appellant's filing date). This is not true, and

appellant's allegation is misleading.

48.   Firstly, the entirety of the Lawrence patent (including the

pertinent limitation of an allowed claim in said patent) has the

presumptive benefit of the filing date of the Lawrence reference

(6/21/1981) which clearly antedated applicant's priority date

(9/28/1982). There is no reason to presume that the examiner of

the Lawrence patent would have permitted new matter to be added in

a claim he was allowing unless such added matter had support in

the "original disclosure".

49.   Secondly, a review of the file history of Lawrence patent

reveals that the pertinent limitation was in fact in the original

Lawrence disclosure. It was in original claim 9, which read :

> "Apparatus as defined in claim 1, wherein said editing means
> is operable when a text editing process has been completed to
> invoke said formatting means to map said edited stored test
> onto said display."

> (See attachment 1, a copy of excerpt from Lawrence file
> wrapper).

50.   In the amendment filed Feb. 17, 1984, the amendment discussed

by appellant, the attorney stated that "(c)laim 9 has been

cancelled <u>because a similar limitation is now included in claims 1 and 4.</u>"   (See attachment 2).

51. Appellant apparently only picked <u>part</u> of the file history to make his allegation. Appellant <u>fails</u> to address the file history <u>as a whole</u>, hence appellant's allegation is certainly misleading. Furthermore, that limitation is a valid prior art teaching under 35 U.S.C 102/103.

52. C. as to the allegation iii, the examiner submits that the formatter is interrupted.

53. Appellant pointed out the inconsistence of terms, i.e. interrupted and invoked, used in the reference. Appellant alleged that the inconsistency should be resolved in favor the term "invoked", not "interrupted".

54. As discussed in details in the body of rejection, paragraphs 21 – 24, supra, and incorporated by reference herein, when the teaching of the <u>whole</u> reference is taken into consideration, the formatter was interrupted by editor wherein the control was subsequently returned, not invoked by the editor, to the formatter. The examiner submits the inconsistency should be resolved in favor of "interrupted", not "invoked" as alleged by appellant.

55. Alternatively, Maddock disclosed a system closely related to the Lawrence et al reference and explicitly taught that reformatting was interrupted by the occurrence of keystroke signals requiring further editing of the text.

56. D. as to allegation iv, the examiner submits that the formatter maintains control of the system.

57. Appellant stated that the statement made by the examiner in the previous rejection was either tautological or inaccurate, i.e.

"During the formatting operation, the interpreter/formatter has control of the system".

58.   To rephrase the statement, the examiner submits that, in Lawrence et al system, once the formatting started, the formatter continuously maintained control of the system until it was interrupted. Alternatively, Maddock also showed that, once the reformatting gained the control of the system, it continuously maintained control of the system until it was interrupted.

59.   E. as to allegation v, the examiner maintains that Lawrence et al alone or in conjunction with Maddock taught the use of interrupt, appellant's claimed mode of operation.

60.   This allegation is essentially the same as allegation iii, supra. The examiner's position as set forth above is incorporated by reference herein. Again, when the teachings of Lawrence et al is taken as a whole or further in view of Maddock, Lawrence et al alone or with Maddock together taught the interrupted mode of operation.

61.   F. as to allegation vi, the examiner submits that Lawrence et al alone or further in view of Maddock taught the passing control back to the formatter after each keystroke.

62.   Appellant stated that Lawrence et al taught "means in said editing means for invoking said formatting means when a _text editing step_ is completed", not after _the code byte_ as asserted by the examiner. Appellant asserted that "a text editing step usually comprises a plurality of keystrokes, there is no disclosure in the reference that control is passed back after each keystroke".

63.   The examiner respectfully traverses appellant's assertion. Specifically, as discussed hereinabove, Lawrence et al did not explicitly discuss what an editing step comprised. It would have been obvious to one of ordinary skill in the DP art that the

disclosed editing step would have included the editing of one
character for editing one character was a legitimate editing step.
In fact, appellant himself implied that editing step would have
included the editing of one character. Specifically, appellant
only asserted that a text editing step usually comprises a
plurality of keystrokes. Appellant did not assert that an editing
step had to comprise a plurality of keystrokes. Hence, appellant
implicitly agreed that the editing step would comprise only one
keystroke (character). In this case, the examiner submits that the
control was passed back to the formatter after each keystroke.
Alternatively, Maddock clearly taught that control is passed back
to the reformatting process after each keystroke.

64.   Appellant asserted that there would be no reason or purpose
for passing control back to the formatter after each keystroke and
before the plurality of keystrokes comprising an editing operation
was completed. The examiner respectfully traverses appellant's
assertion. First of all, when the editing operation had only one
character, the control had to be pass back to the formatter.
Furthermore, the remarks from Lawrence et al filed on Feb. 13,
1984 during the prosecution of the reference gave the reason for
passing the control to the formatter after each keystroke.

65.   Lawrence et al stated that :

> "What is believed to be new in this system is that Applicants
> have provided a data organization and a status index that
> better handles the extended formatting commands to give
> keystroke by keystroke display of the edited text." "Claim 1
> also includes a limitation from Claim 9 to the relationship
> between the editor and the formatter that is significant in
> the keystroke by keystroke display of the edited text."
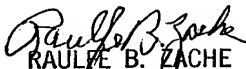> (emphasis added). (See attachment 3).

66.   It should be noted that the limitation from claim 9, i.e.
"said editing means is operable when a text editing process has
been completed to invoke said formatting means to map said edited
stored text onto said display", is the key limitation which

appellant argued in his second allegation that could not be used by the examiner. It is this limitation that allows the system to display each keystroke according to the associated extended format command immediately thereby allowing the user to see the effect of the formatted text right away. This is the reason why the control is being passed back to the formatting process after each keystroke. This is also the same reason why, in Maddock's system, control is being passed back to the reformatting process after each keystroke.

67. G. as to allegation vii, the examiner submits the hardware structure used to implement the interrupt was inherently taught by Lawrence and the necessary conventional structure would have been obvious to one of ordinary skilled in the DP art. On the other hand, Catiller showed the hardware structure to implement the interrupt disclosed by Lawrence et al and Maddock.

68. For the above reason, it is believed that the rejections should be substained.

69. In view of the new ground of rejection applicant has TWO MONTHS from the mailing date of this answer within which to file a reply. Such reply may include any amendment or material appropriate to the new ground. Porsecution otherwise remains closed. Failure to respond to the new ground of rejection will result in dismissal of the appeal of the claims so rejected.

RAULFE B. ZACHE
PRIMARY EXAMINER
ART UNIT 232

1 7.   Apparatus as defined in Claim 1, wherein said
2   segmenting means includes means for inserting in
3   each segment a pointer to the previous segment, a
4   pointer to the next segment and a count indicative
5   of the length of text contained in the segment,
6   and including means to cause updating of said
7   pointers when a new segment is created during
8   editing and to update said count when a character
9   is inserted in or deleted from a segment during
10   editing.

1 8.   Apparatus as defined in Claim 7, wherein said
2   segmenting means includes means for deleting a
3   segment from said store when said count indicates
4   that the segment contains no text.

1 9.   Apparatus as defined in claim 1, wherein said
2   editing means is operable when a text editing
3   process has been completed to invoke said formatting
4   means to map said edited stored text onto said
5   display.

attachment 1

linking segments, which is conventional as was explained in the remarks submitted April 18, 1983. Claim 9 has been canceled because a similar limitation is now included in claims 1 and 4.

The Rejection Under 35 U.S.C. 112 (Second Paragraph)

The amendment follows the comments of the Examiner and only a few comments will be made here.

The phrase, "multi-character extended formatting commands affecting the format of a document" is from page 2, lines 10-12 and page 7, lines 22-24.

In original lines 10-12 the phrase "in accordance with text characters contained therein" has been canceled to separate this function from the preceding limitation, "display for displaying stored text". Although it is customary to say that the display (meaning the display system) formats the text, this function is in fact performed by the "formatting means" which is set out later in the claim.

The length of text in a segment is defined in Claim 1 as follows. The text is broken into lengths to fit inside field 20 of Fig. 2, which in Claim 1 is set out more generally in the phrase, "each segment having ... a predetermined maximum length of text". The text is further segmented according to the limitation, "each segment having at most one extended formatting command therein and segments not having an extended formatting command therein having a slack area not containing data". The examples in the drawing show the text broken between words, as is conventional but not necessary.

The phrase "mapping said text onto the display" refers to the standard operation of assigning each character of text to a position on a display screen. The terminology is conventional as shown by the following definition which is from page 257 of "Vocabulary for Data Processing, Telecommunications, and Office

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Attachment 2

In some text processing systems, text is divided into fragments that in this specification are called "segments". The segments have pointers that permit the segments to be reordered or added or deleted by just changing pointers without actually moving the text. Several of the references show this general organization, but a copy of page 220 of "Pascal Programming Structures" by G. W. Cherry is attached to these remarks because it gives a particularly simple example. In the example of Cherry, all of the segments have the same maximum length of text and each segment has some particular length of text within this limit. In some text editing systems, the segments also carry commands for editing the text. Some commands are like single keys on the keyboard, and for example they cause a line return or a tab. Other commands, which Applicants call extended formatting commands, affect the general format of the text.

The Claims

   In Applicants' system, one object is to format the text on the display screen as each keystroke enters a character of text or a command. What is believed to be new in this system is that Applicants have provided a data organization and a status index that better handles the extended formatting commands to give keystroke by keystroke display of the edited text. There is a problem here because the extended formatting commands may have been entered at several earlier remote points in the text stream. Claim 1 sets out that each extended formatting command has its own segment. This feature simplifies the organization of the extended formatting commands in the index. Claim 1 also includes a limitation from Claim 9 to the relationship between the editor and the formatter that is significant in the keystroke by keystroke display of the edited text. Claim 2 sets out the status index and Claim 3 calls for a page index table in the status index. Claim 4 sets out in more specific scope the relationship between the editing means and the formatting means that provides the keystroke by keystroke operation. Claims 5-8 have been canceled because they recite the pointer system for

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Attachment 3